1969

OPERATING SUMMARY

BURLINGTON

Skyway

water pollution control plant

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

D.S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

CONTENTS

BURLINGTON SKYWAY

water pollution control plant

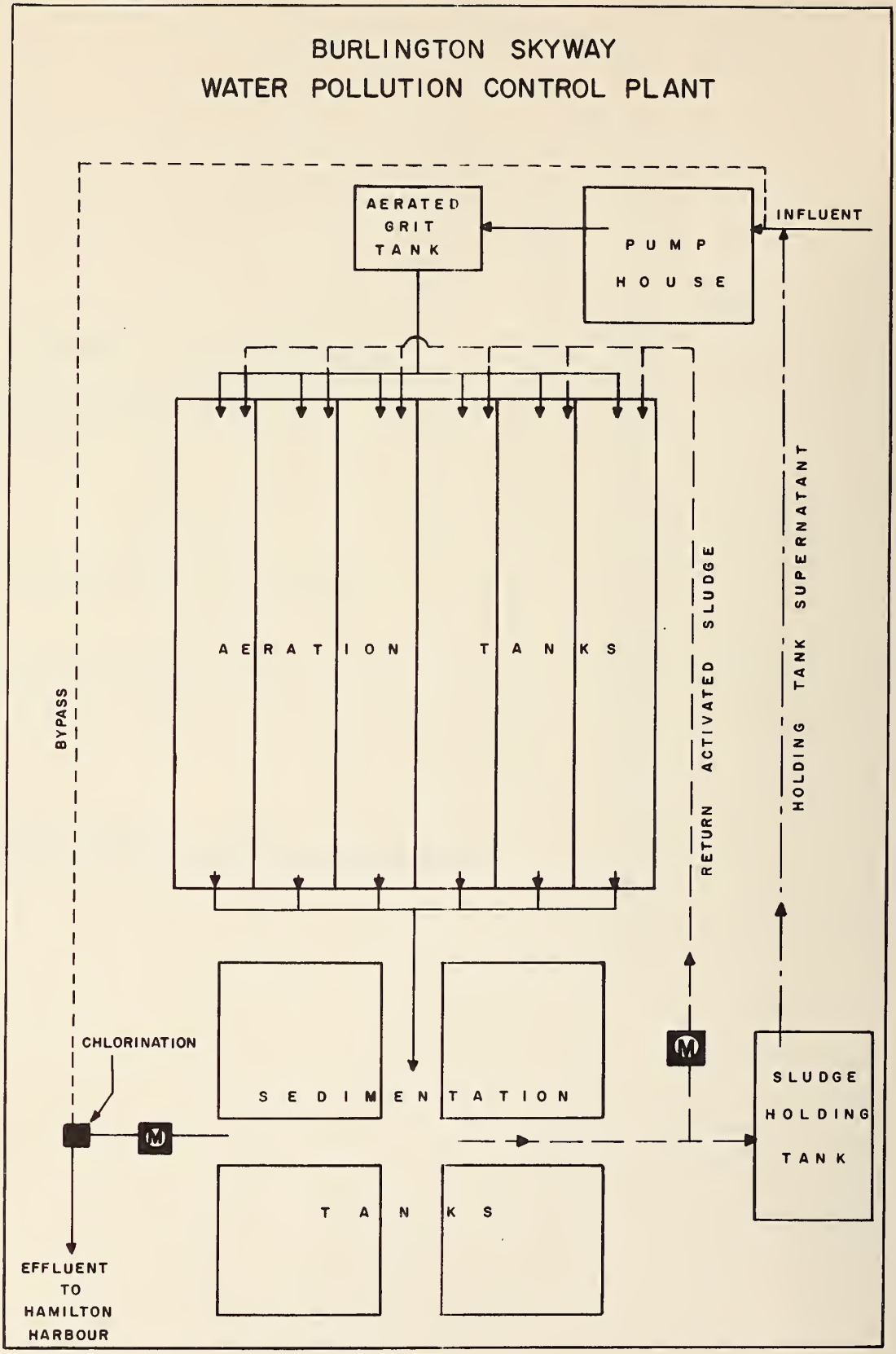
operated for

THE TOWN OF BURLINGTON

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY


BURLINGTON SKYWAY
WATER POLLUTION CONTROL PLANT
AERATED GRIT TANK
PUMP HOUSE
INFLUENT
AERATION TANKS
BYPASS
RETURN ACTIVATED SLUDGE
HOLDING TANK SUPERNATANT
CHLORINATION
SEDIMENTATION
TANKS
SLUDGE HOLDING TANK
EFFLUENT TO HAMILTON HARBOUR

DESIGN DATA

PROJECT NO.	2-0105-62	DESIGN FLOW	6 mgd
BOD - Raw Sewage	200 mg/l	SS - Raw Sewage	200 mg/l

PRETREATMENT

Coarse Screening

Type: Link Belt, mechanically-cleaned
Size: $2\frac{1}{2}$" space

Lift Station Pumps (@ 30' tdh)

2 @ 6 mgd each; 2 @ 5 mgd each

Screening

Type: Link Belt, mechanically-cleaned
Size: 1" space

Grit Removal

Type: Air degritter
Size: One 20.3' x 25' x 14.2'
Retention: 20.8 min

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single pass
Size: Six 270' x 27' x 15'
(660,300 ft. or 4.12 mil gal)
Retention: 16.5 hr
Loading: 9.5 lb BOD/1000 ft^3

Air Supply

Type: Hoffman multi-stage
centrifugal blowers
Size: 3 - 4000 cfm (max); 1-6000 cfm (max)

Diffusers

Type: Saran-covered flexofusers
Spacing: 250 tubes per tank

Secondary Sedimentation

Type: Eimco
Size: Four 60' x 60' x 12' swd
(538,000 gal)
Retention: 4.1 hours
Loading: Surface, 434 gal/ft^2/day
Weir, 7,100 gal/ft/day

CHLORINATION

Type: Fischer & Porter
Size: Two 2000 lb/day

Chlorine Contact Chamber

- nil
- chlorination in outfall

OUTFALL

- to Hamilton Harbour

SLUDGE HANDLING

Type: Thickening tank, decanted
Size: One 20' dia x 9' depth
(2830 ft^3 or 1760 gal)

'69 REVIEW

GENERAL

The expansion of plant facilities to increase the hydraulic capacity from 3 to 6 mgd will be completed in March, 1970, and the restoration of plant grounds, in the summer.

Oil wastes were experienced on two or three occasions during the year. Hercules Chemical and Powder Limited who accepted responsibility for the wastes, were prompt in cleaning plant equipment and facilities coated with the oil.

One of the aeration bays was used as an aerobic digester while the thickening tank was out of service. This is reflected in 1969's decreased sludge haulage quantities from the previous year.

A total of 1,218.1 million gallons of raw sewage was treated during the year, a decrease of 10.8% from 1968 which was attributed to lower storm flows received at the plant.

The decrease in storm flows is also reflected in increased raw sewage strengths during the year. The BOD increased from 128 milligrams per litre in 1968 to 155 mg/l in 1969, and the suspended solids from 161 to 185 mg/l. The average effluent quality of 12 mg/l for both was excellent.

EXPENDITURES

The 1969 operating costs for the Burlington Skyway plant were $80,952.25, or $66.46 per million gallons treated. The increase in operating costs over 1968 was 17 percent.

PLANT FLOWS and CHLORINATION

The average daily flow of 3.30 million gallons represents a decrease of

10.8% from 1968. The maximum daily flow of 6.3 million gallons occurred in April and the minimum of 1.7 million gallons in March.

Chlorination is carried out between the months of May and November for disinfection purposes only. An average dosage of 3.4 mg/l was required to maintain a 15-minute chlorine residual of 0.5 mg/l in the effluent.

PLANT EFFICIENCY

The BOD and suspended solids reductions of 92% and 94% respectively in 1969 were similar to the reductions in the previous year. The increase in raw sewage strength resulted in an increase in the average final effluent BOD to 12 mg/l. The suspended solids effluent quality, also 12 mg/l, was similar to the previous year.

A total of 6,185 cubic feet of grit was removed in 1969. This increase of 77.4% over 1968 resulted from reductions of the air rate in the grit chamber to improve removal efficiencies.

SLUDGE DIGESTION and DISPOSAL

A total of 7,459 cu. yd. of waste activated sludge was removed from the plant during the year. This represented a decrease from 1968 of approximately 524 cu. yd. which is approximately equivalent to the volume maintained in the aerobic digester at the year end.

CONCLUSIONS

The average daily flow of 3.3 million gallons exceeded the design flow capacity by 10%. In spite of this overloading, a good-quality effluent was produced.

Expansion of plant facilities to increase the design flow capacity to 6 mgd will be completed in March, 1970.

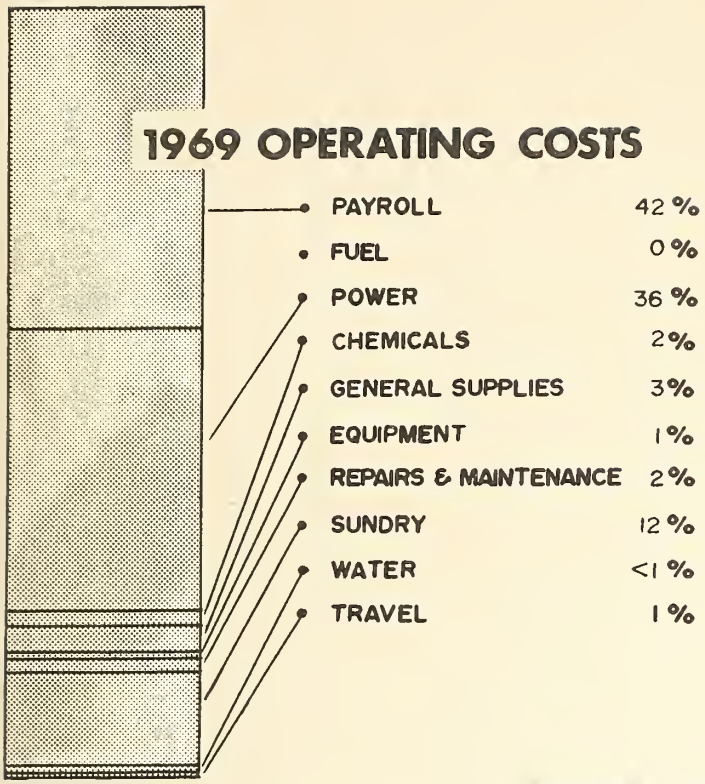
Oil wastes were experienced on a few occasions during the year. However, the company responsible for dumping these wastes took immediate action on subsequent clean-up.

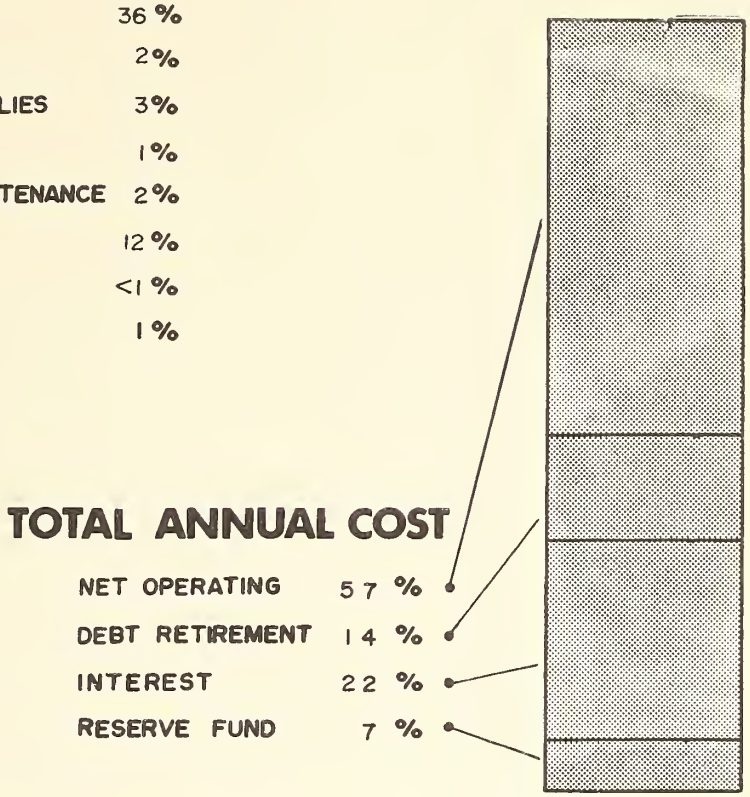
PROJECT COSTS

NET CAPITAL COST (Final)	$1,796,844.53
DEDUCT - Portion financed by CMHC/MDLB (Final)	1,240,059.57
Long Term Debt to OWRC	$ 556,784.96
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$ 156,438.53
Net Operating	$ 80,952.25
Debt Retirement	20,200.00
Reserve	9,392.21
Interest Charged	31,171.53
TOTAL	$ 141,715.99

RESERVE ACCOUNT

Balance @ January 1, 1969	$ 63,677.19
Deposited by Municipality	9,392.21
Interest Earned	2,952.62
	$ 76,022.02
Less Expenditures	39,602.52
Balance @ December 31, 1969	$ 36,419.50





Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	965.29	$51,736.82	$53.60	3 cents
1966	1011.46	59,744.34	59.07	3 cents
1967	1419.27	64,725.24	45.60	5 cents
1968	1365.20	69,386.01	50.82	4 cents
1969	1218.10	80,952.25	66.46	5 cents

Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	6270.81	3579.45	-	-	2428.30	-	68.51	87.75	-	-	30.15	76.65
FEB	6338.75	2194.83	-	-	2627.98	89.12	342.62	230.20	196.70	627.15	30.15	-
MAR	6086.80	2071.06	-	-	2580.46	-	281.85	-	-	991.88	30.15	131.40
APR	6093.88	2552.34	-	-	2275.84	-	166.57	-	332.34	599.87	30.15	136.77
MAY	4773.79	1965.11	-	-	2392.77	-	41.72	-	276.74	67.30	30.15	-
JUNE	7120.44	2062.32	375.42	-	2215.54	1501.50	477.08	-	-	330.13	30.15	128.30
JULY	6294.58	2404.60	546.52	-	2169.88	-	146.11	-	67.84	895.88	30.15	33.60
AUG	9484.47	4840.87	782.71	-	2523.78	-	166.75	13.00	81.83	976.23	30.15	69.15
SEPT	6364.35	1895.70	389.52	-	2636.97	76.44	396.61	-	1.50	874.01	30.15	63.45
OCT	6363.19	2210.99	293.41	-	2465.85	-	173.19	-	113.90	912.59	30.15	163.11
NOV	5761.69	2797.86	328.22	-	2311.16	-	126.97	-	61.90	105.43	30.15	-
DEC	9999.50	1758.10	345.62	-	2722.70	-	472.40	644.05	232.20	3742.76	30.15	51.52
TOTAL	80952.25	30333.23	3061.42	-	29351.23	1667.06	2860.38	975.00	1364.95	1012.23	361.80	853.95

BRACKETS INDICATE CREDIT

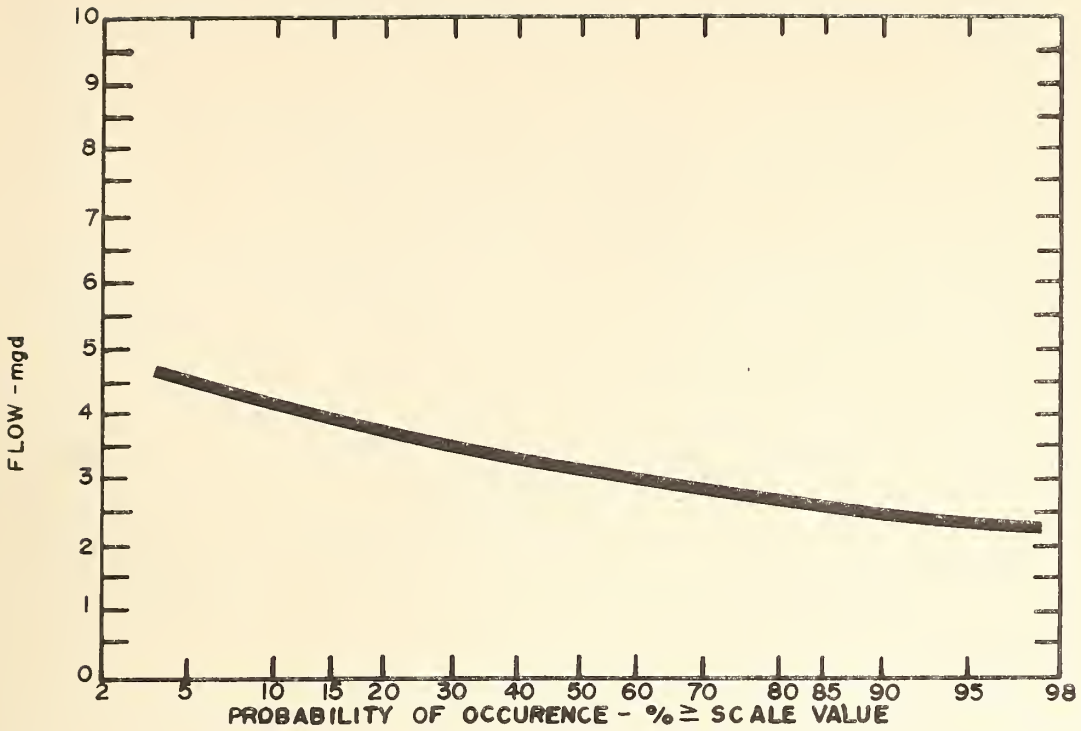
* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $7,539.30

PROCESS DATA

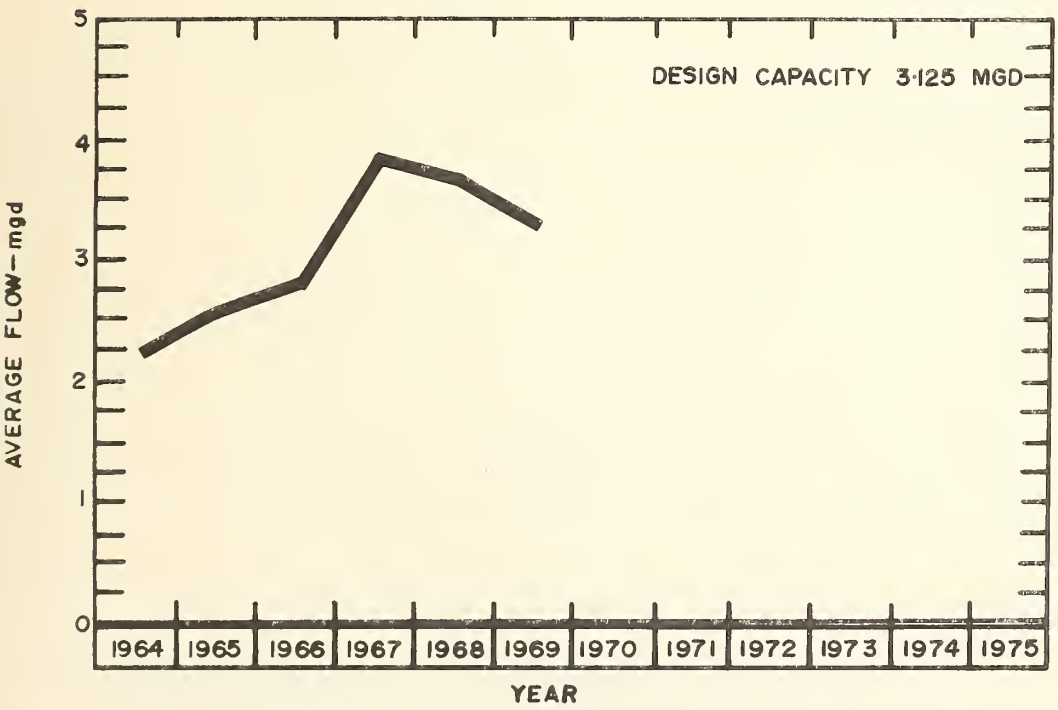
PLANT FLOWS and CHLORINATION

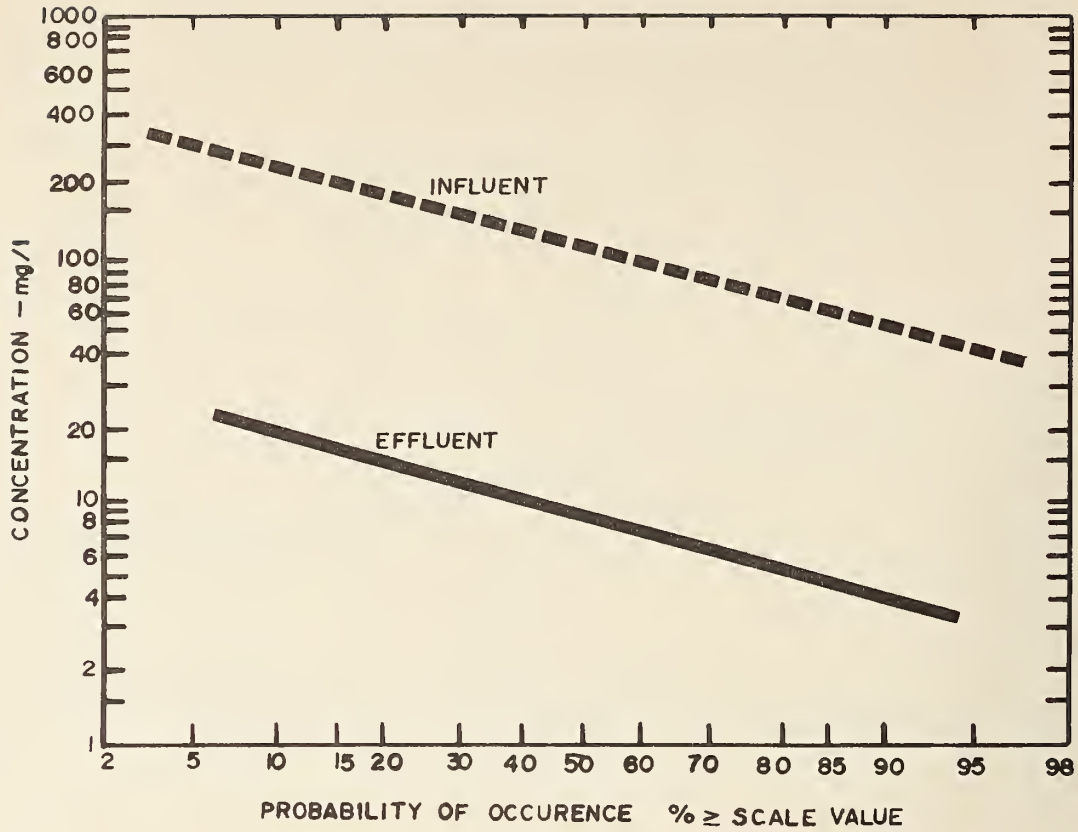
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	119.4	3.9	5.3	2.5	0	0
FEB	89.9	3.2	5.2	2.5	0	0
MAR	89.2	2.9	4.4	1.7	0	0
APR	107.1	3.6	6.3	2.2	0	0
MAY	131.4	4.2	4.9	3.3	2430*	1.8
JUNE	111.4	3.7	4.5	2.6	3839	3.4
JULY	117.4	3.8	4.7	3.0	3280	2.8
AUG	160.1	3.4	4.0	3.5	3208	3.0
SEPT	86.3	2.9	3.5	2.2	2892	3.4
OCT	82.5	2.7	5.3	2.0	1420*	3.4
NOV	85.2	2.8	3.5	2.4	0	0
DEC	92.2	2.5	4.4	2.0	0	0
TOTAL	1218.1	-	-	-	18069	-
AVERAGE	-	3.3	-	-	3614	3.4

* Chlorination from May 15 to October 15

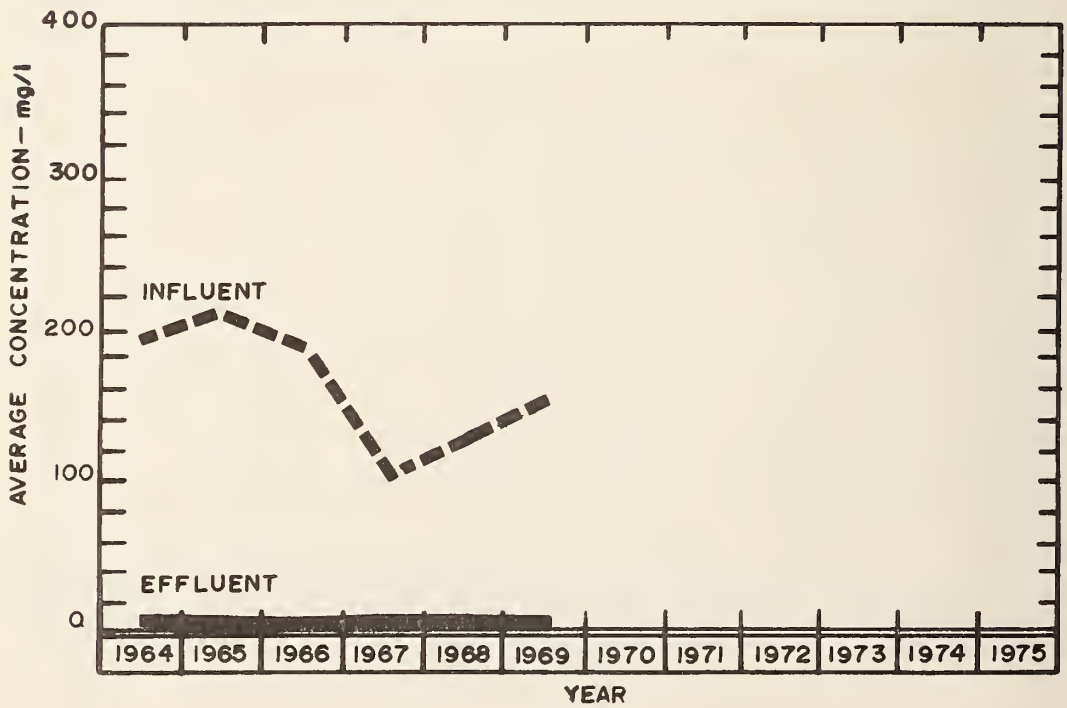

FLOW - mgd
0
1
2
3
4
5
6
7
8
9
10
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

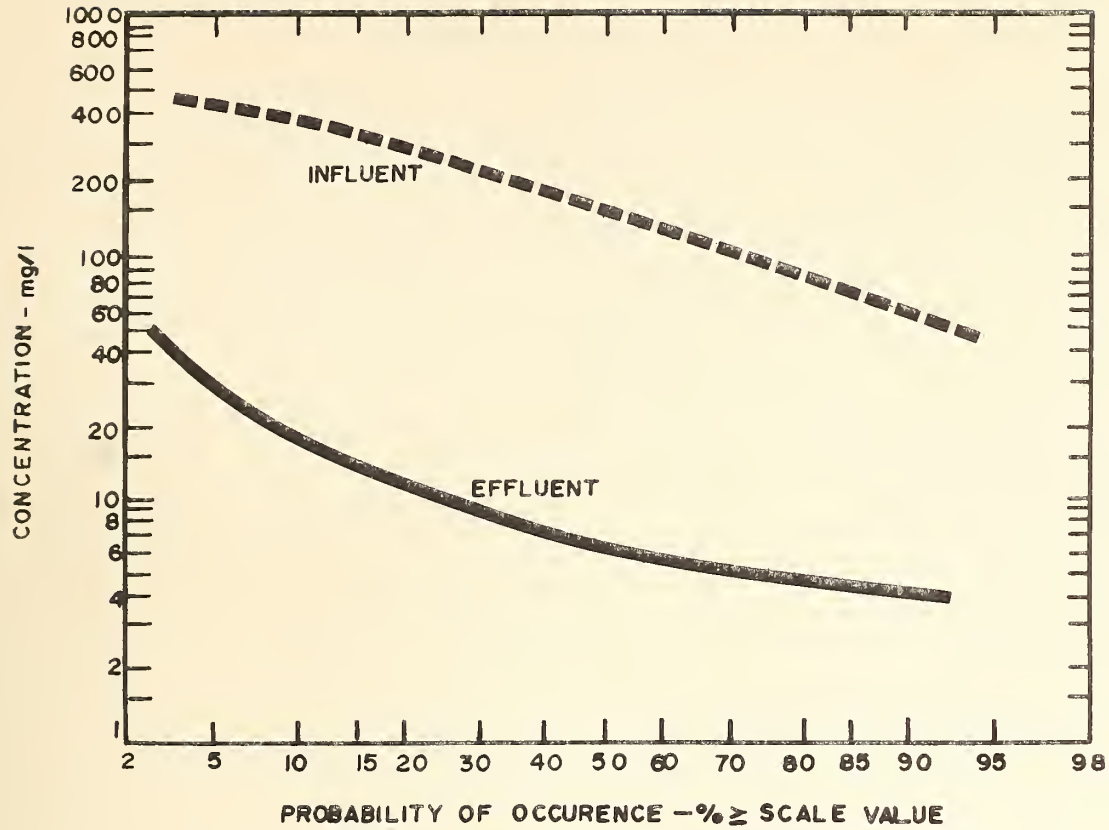
FLOWS


AVERAGE FLOW — mgd
0
1
2
3
4
5
DESIGN CAPACITY 3·125 MGD
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

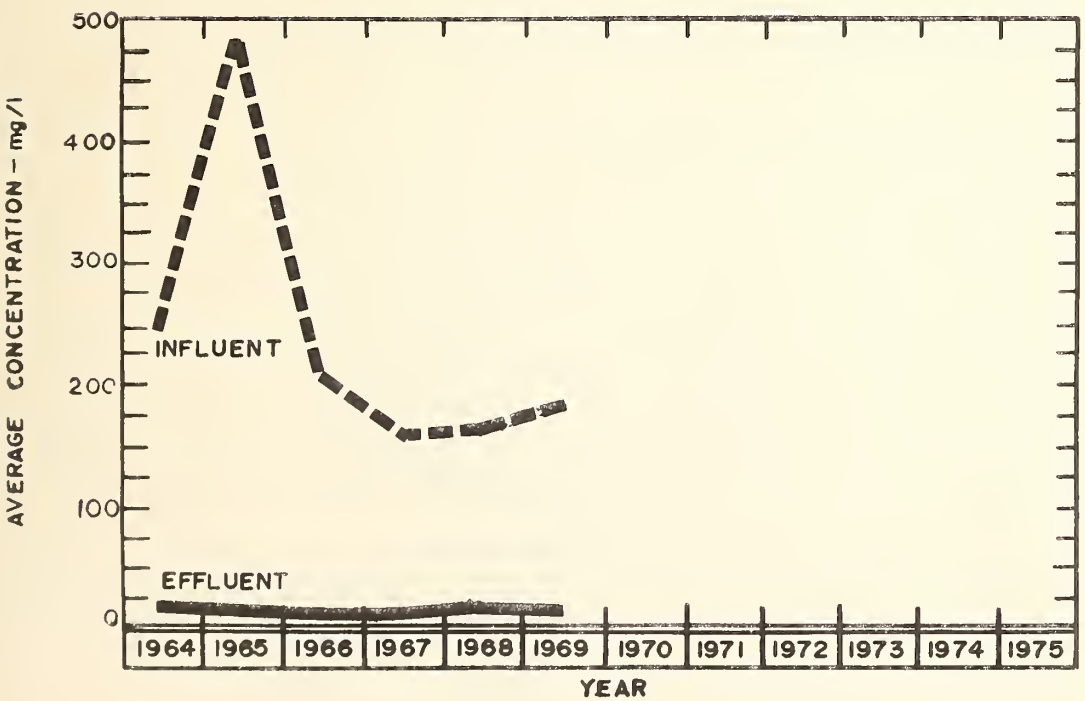


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF.	EFF.	REDUCTION		INF. CONCN	EFF. CONCN	REDUCTION		
	mg/l	mg/l	%	10^4 pounds	mg/l	mg/l	%	10^4 pounds	cu ft
JAN	175	9	95	19.8	150	10	93	16.7	630
FEB	80	7	91	6.6	180	10	94	15.3	210
MAR	120	18	85	9.1	155	30	45	11.2	510
APR	84	8	90	8.1	100	8	92	9.8	630
MAY	195	13	93	23.9	215	8	96	27.2	950
JUNE	130	9	93	13.5	140	10	93	14.5	590
JULY	100	10	90	10.6	110	15	86	11.2	730
AUG	130	6	95	13.2	237	6	97	24.5	395
SEPT	140	5	96	11.7	210	10	95	17.3	240
OCT	122	10	92	9.2	107	13	88	7.8	240
NOV	390	21	96	31.5	335	12	96	27.5	240
DEC	203	26	87	16.3	288	12	95	25.5	820
TOTAL	-	-	-	-	-	-	-	208.5	6185
AVERAGE	155	12	92	14.4	185	12	94	17.4	515

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF. BOD mg/l	AERATION INF. SS CONCN mg/l	SECONDY. EFF. BOD mg/l	SECONDY. EFF. SS CONCN mg/l	MLSS CONCN mg/l	F/M lb BOD / lb MLSS	AIR USED 1000 cu ft / lb BOD	WASTE SLUDGE lb/DAY
JAN	3.9	175	150	9	10	3120	.07	1.32	-
FEB	3.2	80	180	7	10	3740	.02	3.52	-
MAR	2.9	120	155	18	30	3510	.03	3.52	-
APR	3.6	84	100	8	8	2310	.05	3.48	-
MAY	4.2	195	215	13	8	3670	.08	1.19	-
JUNE	3.7	130	140	9	10	3250	.05	2.09	-
JULY	3.8	100	110	10	15	3400	.04	2.91	-
AUG	3.4	130	237	6	6	6250	.02	2.28	-
SEPT	2.9	140	210	5	10	5060	.02	3.49	-
OCT	2.7	122	107	10	13	3610	.03	3.60	-
NOV	2.8	390	335	21	12	4010	.08	1.07	-
DEC	2.2	203	288	26	12	3420	.04	2.59	-
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	3.3	155	185	12	12	3779	.04	2.24	-

SLUDGE DISPOSAL

Month	Liquid (cu. yd.)	Month	Liquid (cu. yd.)
January	821	July	802
February	808	August	874
March	476	September	863
April	0	October	771
May	265	November	507
June	753	December	519
	Total:	7459 cu. yd.	
	Average:	678 cu. yd.	

Water management in Ontario